

the present study, ate so poorly after gastrectomy that they could not maintain weight and health, several have remained in good health after 6 months.

The hypothesis that acid produced by the main stomach when exogenous gastrin is given acts in some way to limit further secretion of acid by pouch and stomach is attractive and is supported by Andersson's observation that acidification of the duodenum inhibits the secretory responses of gastric pouches to gastrin(3). More work is necessary to prove or disprove this hypothesis in this setting and to explain the mechanism involved.

Summary and conclusions. Secretory responses of 4 Heidenhain pouches to gastrin prepared from antral mucosa of hogs were augmented following gastrectomy. The Heidenhain-pouch preparation with gastrectomy is useful for detection of gastrin-like activity in extracts of tissue.

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Clearance of Rb⁸⁶ from Coronary Blood by the Atria of Dogs.* (28208)

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Little is known about blood flow to the atrial wall because conventional methods cannot be applied readily to this portion of the myocardium. The rate at which the ventricular myocardium clears Rb⁸⁶ from arterial plasma closely parallels the amount of coronary blood flow reaching it(1). Recent studies have shown that the relationship of flow and Rb⁸⁶ uptake is the same in the right and left ventricles, and that the rate of flow to the ventricles can be predicted from the rate of myocardial Rb⁸⁶ clearance with a mean error of approximately 6%(2). These results prompted the present measurements of rates of Rb⁸⁶ uptake in the atria.

Materials and methods. Eighteen dogs weighing 13.7 to 24.0 kg were anesthetized with pentobarbital, 30 mg/kg and subjected to right lateral thoracotomy with artificial respiration, 300 ml air/kg/min. After heparinization, Rb⁸⁶ in 0.15 M NaCl was infused at a continuously decreasing rate(3) over a pe-

riod of 10 minutes, following which the animals were sacrificed. During the infusion of isotope, blood was continuously aspirated for measurement of mean arterial Rb⁸⁶ concentration by scintillation counting. Cardiac output was measured by the dye dilution technique after 5 minutes of isotope administration. Following sacrifice, 5 specimens were taken from the atria and their Rb⁸⁶ content was determined after they had been digested in HNO₃. These were: portions of the left and right atria which were free of gross deposits of fat; the remainder of each atrium; and the entire interauricular septum. Samples were also obtained from each ventricle. Pressure within the right atrium was measured with a saline manometer. The reference level was the superior surface of the exposed heart.

Results and interpretation. An average of 10.9% of the isotope taken up by the heart was present in the atria. Of this amount, 39% was found in the left atrium, 45% in the right atrium, and 16% in the interauricular septum. Fig. 1 shows that atrial clearance of Rb⁸⁶ ranged from a maximum of 16.5% to a minimum of 7.1%. It made up a larger portion of the total myocardial uptake in ani-

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mals with low cardiac output. Clearance did not differ consistently in the separate areas of the atria. Mean values per gram of atrium were: left atrium 0.39, right atrium 0.42, and interatrial septum 0.38 ml blood cleared/g/min. Fig. 2 shows that these rates were quite variable, and that in each animal atrial clearance in the separate areas was usually in the same range. These rates are substantially less than those noted previously in unoperated dogs(1). This probably reflects the better condition of the unoperated animals. At the relationships present in the ventricles, an Rb^{86} clearance of 0.4 ml would correspond to a blood flow of approximately 0.5 ml.

In almost one-half of the dogs Rb^{86} clearance per gram of atrium was higher than that in the adjacent ventricle. Fig. 3 shows that this finding was somewhat more frequent in the right heart, and that it occurred only in animals with cardiac output below 50 ml plasma/kg/min. This suggests that when cardiac output declines flow is better maintained to the atria than to the ventricles. The data in Fig. 1 also support this conclusion.

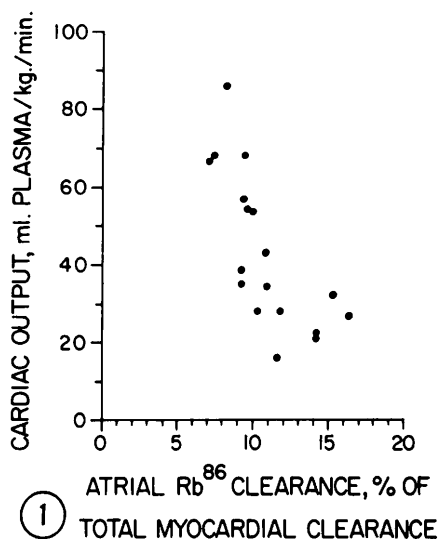
In the observed range of 31 to -15 mm 0.15N NaCl, right atrial Rb^{86} clearance was unrelated to right atrial pressure.

Discussion. In the case of the ventricles, rates of clearance of Rb^{86} and blood flow have been compared directly by using the Fick principle(2). This has not yet been done in the atria, since techniques for collection of venous blood from the atrial wall have not been developed. Infusion of pitressin or l-norepinephrine, which respectively decrease and increase the rate of coronary blood flow, produce changes in Rb^{86} uptake in the atria which parallel those in the ventricles(1). In a recent study of the effects of pulmonary embolism, overloading of both the right ventricle and right atrium was produced. Uptake of Rb^{86} increased in the walls of both chambers (4). The close relationship of Rb^{86} uptake and blood flow in the myocardium is related to its high rate of metabolism and associated

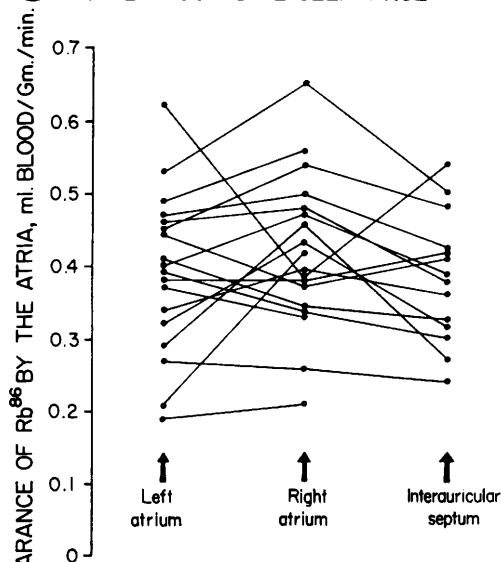
FIG. 1. Relation of clearance of Rb^{86} by atria to level of cardiac output.

FIG. 2. Clearance of Rb^{86} in 3 areas of atria of dogs.

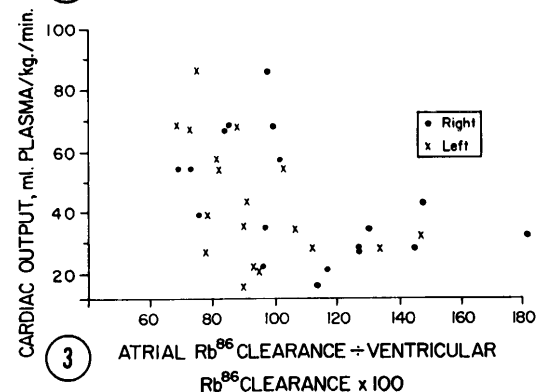
FIG. 3. Relation of cardiac output to ratio of atrial and ventricular clearance of Rb^{86} .



① ATRIAL Rb^{86} CLEARANCE, % OF TOTAL MYOCARDIAL CLEARANCE



②



③

rapid exchange of electrolytes. Oxygen uptake of slices of atrium *in vitro* is approximately the same as that of slices from the right ventricle(5).

MacLean, Hedenstrom, and Kim have studied the distribution of glass microspheres in the beating but empty canine heart(6). In their animals 6% of the spheres entering the coronary arteries were found in the atria. This agrees with the lowest values for Rb⁸⁶ uptake observed in the present group. Two groups have measured the rate of blood flow into the cannulated left anterior atrial artery. Smith and Layton found an average flow of approximately 0.15 ml/cycle in the heart-lung preparation(7). Moir, Driscoll, and Eckstein reported a flow of 4.4 ml/min or 72 ml/100 g of left atrium/min(8). This is compatible with the present isotope data.

Summary. The rate of clearance of Rb⁸⁶ from blood by several areas of the atria was studied in 18 dogs because of evidence that Rb⁸⁶ uptake and rate of coronary blood flow are closely related. Mean rates of clearance averaged 0.40 ml blood/g/min. These were

not significantly different in the right atrium, left atrium and interatrial septum. Rb⁸⁶ uptake by the atria formed a larger portion of total myocardial uptake when cardiac output was low. Frequently the clearance per gram of tissue exceeded that found simultaneously in the ventricles. This indicates that atrial flow is better maintained when the animal is in poor condition than is flow to the ventricles.

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Inactivation of Hemagglutinating Capacity of Type A Influenza Virus By Trypsin Treatment.* (28209)

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The present communication describes the effect of certain environmental conditions on inactivation of influenza virus by crystalline trypsin, as determined by loss of hemagglutinating capacity. The aim of the study was not only to obtain information on factors influencing the virus-trypsin reaction, but also to determine whether the relative trypsin-susceptibility among a group of strains would vary with the conditions under which the tests were made. Only type A strains of human origin were used because in a previous study(1) neither any of 4 type B strains nor the one type A strain of swine origin exam-

ined showed reduction in hemagglutination titer following treatment with this enzyme.

Materials and methods. *Viruses.* The strains used were WS/33, PR8/34, BH/36, Cam/46, S-1/53 and Japan 305/57. All were adapted to growth in chick embryos.

Groups of 10-day-old embryonated eggs were inoculated with 0.2 ml of a 10⁻⁴ dilution of seed virus, incubated for 48 hr at 36°C, chilled and the allantoic fluids harvested. Infected fluids from each group were pooled and clarified by low speed centrifugation. Virus was then sedimented by centrifugation at 30,000 rpm for 30 minutes in a Spinco model L ultracentrifuge (# 40 rotor), resuspended to approximately 1/10 original volume in buf-

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